Trend Study 18-6-02

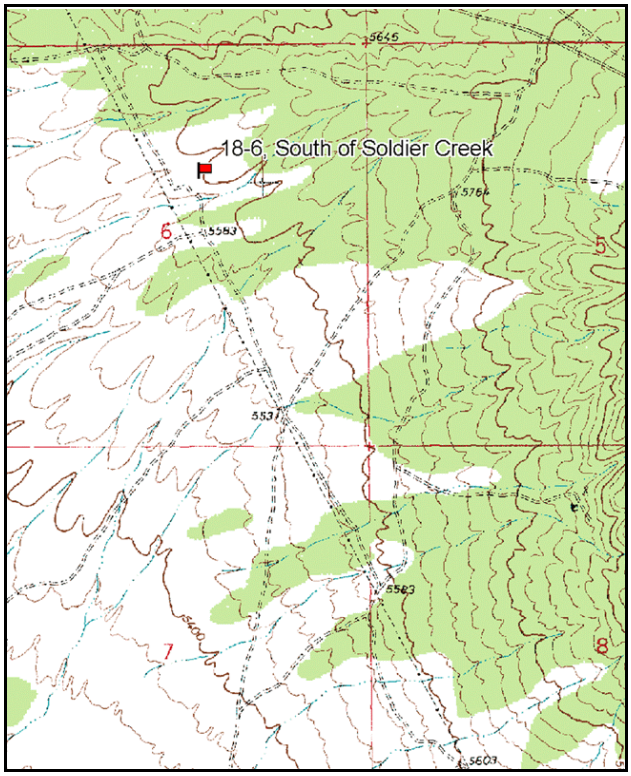
Study site name: South of Soldier Creek . Vegetation type: Chained, Seeded P-J .

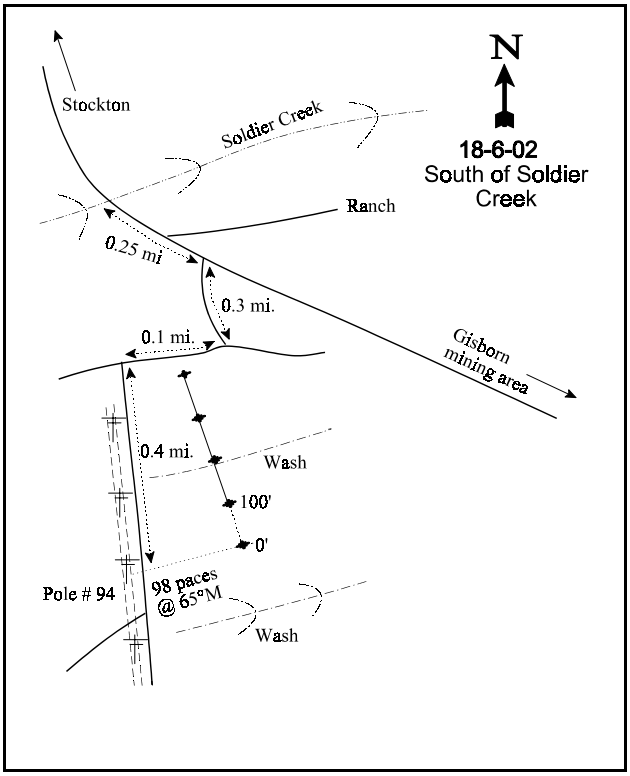
Compass bearing: frequency baseline 338 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the town of Stockton, proceed south on the Soldier Creek road until the road crosses over the creek. Go 0.25 miles from the creek and turn right (south) on a road that goes up on the bench to the south. Travel on this road for 0.30 miles to an intersection at the top of the hill. Turn right (west) and travel 0.10 miles to another intersection. Turn left (south) and travel 0.40 miles to where there is a double power pole on the west side of the road. From power pole #94, walk 98 paces at an azimuth of 65 degrees magnetic to the 0-foot mark of the frequency baseline, marked by a steel fencepost 15 inches in height.





Map Name: Stockton

Diagrammatic Sketch

Township 5S , Range 4W , Section 6

GPS: NAD 27, UTM 12S 4474662 N, 386629 E

DISCUSSION

South of Soldier Canyon - Trend Study No. 18-6

This study is located on an old BLM chained and seeded area immediately south of Soldier Creek. The site has a gentle 5% slope on a west facing bench formerly occupied by a dense stand of juniper and pinyon trees. Elevation is about 5,580 feet. The seeded area is within the limits of severe winter range for deer. However, judging from observations of the number of pellet groups and the level of forage utilization, relatively few deer occupy the area in the winter. Quadrat frequency of deer pellet groups was moderately low in 1997 at 19%. The key browse also showed only light to moderate use. There were scattered signs of use by elk and cattle, with most being associated with the washes running through the bench. Pellet group transect data from 2002 estimated only 4 deer and 5 elk days use/acre (10 ddu/ha and 12 edu/ha). Rabbit sign was fairly abundant in 2002.

Soil is moderately shallow and fairly rocky on the surface, but otherwise rather fine textured. Soil textural analysis indicates a clay loam soil with a soil reaction that is slightly alkaline (pH 7.5). Effective rooting depth was estimated at 11 inches with an average soil temperature of 59°F at 12 inches. Phosphorus is low at only 5.6 ppm. Values less than 10 ppm may limit normal plant growth and development. Parent material appears to be sedimentary limestone or shale. Erosion is not a significant factor on the site, with the erosion condition class determined as stable in 2002.

Browse composition and density are well below average for comparable seeded areas, especially for those on which improved big game habitat was one of the principal objectives. The presence of direct-seeded or transplanted shrubs cannot be documented. The key preferred shrub for the site is a low elevation form of mountain big sagebrush. This area occurs at the ecotone of Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) and mountain big sagebrush (*Artemisia tridentata vaseyana*) and there appears to be some hybridizing occurring between the two subspecies. Density was estimated at about 1,300 plants/acre in 1983 and 1989, but the much larger sample used in 1997 and 2002 estimate a much lower population of 680 plants/acre in 1997 and 880 plants/acre in 2002. Utilization has been mostly light over all readings with some moderate to heavy use occurring in 1997 and 2002. It appears that some sagebrush plants are more preferred as there is differential use occurring. Some plants are not utilized while others are heavily browsed. The plants with more mountain big sagebrush characteristics display heavier use.

Narrowleaf low rabbitbrush is the next most productive browse species which made up 28% of the browse cover in 1997 and 20% in 2002. This species is low in palatability and is mostly unutilized. Some of the use on this shrub appears to be from the numerous rabbits on the site. Less abundant shrubs include broom snakeweed and pricklypear cactus. A few Utah juniper and single-leaf pinyon pine occur on the site as well. Point-quarter measurements from 2002 estimate a density of 84 juniper trees/acre with an average diameter of nearly 5 inches. Trees are mostly mature in the 10 to 12 foot tall range. Young trees are uncommon and the stand does not appear to be increasing.

The herbaceous understory is dominated by crested wheatgrass with lesser amounts of bluebunch wheatgrass and Sandberg bluegrass. Indian ricegrass also occurs in small numbers. Annual cheatgrass is found on the site but it is not abundant. The forb composition is diverse but consists of species possessing relatively poor forage value. Abundance and productivity are significantly less than for grasses as forbs produce only about 27% of the herbaceous cover. No evidence of commonly seeded forbs, such as alfalfa, small burnet, or yellow sweetclover were observed anywhere on the chained and seeded site.

1983 APPARENT TREND ASSESSMENT

This seeded area has apparently matured to the point where a relatively stable condition exists. As big game winter range, the area has only fair value because of a shortage of desirable browse. As livestock range, it would be preferable to untreated juniper-pinyon, but still is not considered an important grazing area. Soil trend appears stable because of the nearly level terrain. Vegetative condition may be very slowly changing. Both narrowleaf low rabbitbrush and mountain big sagebrush appear to be slowly increasing. Grasses and forbs seem relatively static. A significant return of juniper or pinyon trees is at least 15 to 20 years in the future.

1989 TREND ASSESSMENT

With the increase in vegetative basal cover and a decrease in percent bare soil, trend for soil is considered improved. There was a significant increase in bluebunch wheatgrass and Sandberg bluegrass, while crested wheatgrass was stable. The forbs are still poorly represented on this site, but the herbaceous understory trend would be up at this time. For the browse, specifically mountain big sagebrush, trend is stable. However, there are some indications that drought conditions have caused some problems with a substantial increase in percent decadence. Use is also heavier than in 1983.

TREND ASSESSMENT
soil - up slightly (4)
browse - stable (3)
herbaceous understory - up (5)

1997 TREND ASSESSMENT

The trend for soil continues to be stable, but it is still in poor condition. Two things help protect what soil there is left on the site; the lack of any significant slope and almost 70% of the vegetation cover is contributed by herbaceous species. Compared to woody species, herbaceous vegetation better protects the soil from destructive high intensity summer storms. The key browse species for the site is a low elevation form of mountain big sagebrush that shows normal vigor, good numbers of young plants but no seedlings. Percent decadence has declined substantially from 25% to 9%. The major problem is that the population is low for this kind of site at only 680 plants/acre. This could be reflective of poor site potential. Trend for the key browse is stable even with the lower density, which is mostly reflective of the larger sample size used in 1997. The herbaceous understory's trend is slightly down due to a decline in the sum of nested frequency of perennial grasses, especially bluebunch wheatgrass. Frequency of forbs increased slightly.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - down slightly (2)

2002 TREND ASSESSMENT

Trend for soil is stable. Cover of bare ground has increased slightly but litter and vegetation cover have remained similar and the soil erosion condition class was determined as stable in 2002. Trend for the key browse, mountain big sagebrush, is stable. Density has increased slightly but it is still relatively low at only 880 plants/acre. Utilization was heavier in 2002 compared to previous readings, with 30% of the shrubs sampled displaying moderate use and 27% showing heavy use. The number of decadent plants also increased to 34% of the population. These trends are driven by drought and the sagebrush should improve with a return to normal precipitation patterns. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses and forbs remained similar to 1997 estimates. The herbaceous understory is still dominated by crested wheatgrass, bluebunch wheatgrass, and Sandberg bluegrass. Cheatgrass is present in low numbers.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 18 , Study no: 6

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
G	Agropyron cristatum	a106	a101	b159	ab141	46	43	61	54	6.64	7.07
G	Agropyron spicatum	b146	c210	a74	a60	53	72	30	27	3.30	4.47
G	Bromus tectorum (a)	-	-	82	63	-	-	28	24	3.16	1.77
G	Oryzopsis hymenoides	22	14	8	13	9	8	4	6	.22	.33
G	Poa secunda	a60	c177	b128	bc143	24	70	48	55	2.21	2.82
G	Sitanion hystrix	7	4	-	-	3	2	-	-	-	-
Total for Annual Grasses		0	0	82	63	0	0	28	24	3.16	1.77
Total for Perennial Grasses		341	506	369	357	135	195	143	142	12.38	14.71
Total for Grasses		341	506	451	420	135	195	171	166	15.55	16.49
F	Alyssum alyssoides (a)	-	-	a-	b21	-	-	-	7	-	.20
F	Allium spp.	-	-	-	1	-	-	-	1	-	.00
F	Antennaria rosea	-	1	1	-	-	1	1	-	.00	-
F	Arabis spp.	-	-	4	-	-	-	2	-	.01	-
F	Astragalus beckwithii	a-	a-	b13	a-	-	-	6	-	.27	-
F	Astragalus tenellus	a-	a-	b13	a-	-	-	5	-	.36	-
F	Astragalus spp.	1	4	6	3	1	2	4	2	.03	.04
F	Astragalus utahensis	-	-	-	3	-	-	-	1	-	.00
F	Camelina microcarpa (a)	-	-	3	-	-	-	1	-	.00	-
F	Calochortus nuttallii	-	2	6	3	-	1	4	1	.02	.00
F	Cirsium spp.	-	-	-	1	-	-	-	1	-	.00
F	Cryptantha spp.	-	2	-	-	-	1	-	-	-	-
F	Erodium cicutarium (a)	-	-	6	-	-	-	3	-	.01	-
F	Erigeron pumilus	1	3	1	-	1	1	1	-	.03	-
F	Gilia spp. (a)	-	-	-	1	-	-	-	1	-	.00

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
F	Lathyrus brachycalyx	$_{a}$-	$_{a}$-	$_{b}$19	$_{c}$53	-	-	7	21	1.04	2.10
F	Petradoria pumila	$_{a}$19	$_{ab}$26	$_{bc}$51	$_{c}$51	9	12	20	19	2.09	1.72
F	Phlox hoodii	$_{ab}$69	$_{b}$93	$_{ab}$66	$_{a}$62	33	48	30	23	.98	.93
F	Phlox longifolia	-	-	13	9	-	-	4	5	.02	.05
F	Ranunculus testiculatus (a)	-	-	175	157	-	-	59	49	1.40	.59
F	Sisymbrium altissimum (a)	-	-	3	-	-	-	1	-	.03	-
Total for Annual Forbs		0	0	187	179	0	0	64	57	1.45	0.80
Total for Perennial Forbs		90	131	193	186	44	66	84	74	4.88	4.86
Total for Forbs		90	131	380	365	44	66	148	131	6.34	5.66

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 18 , Study no: 6

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Artemisia tridentata vaseyana	24	31	2.31	1.92
B	Chrysothamnus viscidiflorus stenophyllus	61	48	2.71	2.30
B	Gutierrezia sarothrae	14	16	.36	.40
B	Juniperus osteosperma	5	7	3.76	6.07
B	Opuntia spp.	3	4	.15	.15
B	Pinus monophylla	1	1	.38	.53
Total for Browse		108	107	9.69	11.39

CANOPY COVER --
Herd unit 18 , Study no: 6

Species	Percent Cover	
	'97	'02
Juniperus osteosperma	3.8	6

Key Browse Annual Leader Growth
Herd unit 18 , Study no: 6

Species	Average leader growth (in)
	'02
Artemisia tridentata vaseyana	1.8

Point-Quarter Tree Data
Herd unit 18 , Study no: 6

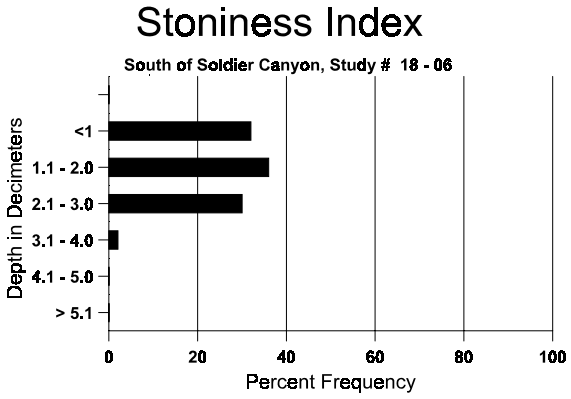
Species	Trees per Acre		Average diameter (in)	
	'97	'02	'97	'02
Juniperus osteosperma	33	84	4.6	4.7

BASIC COVER --
Herd unit 18 , Study no: 6

Cover Type	Nested Frequency		Average Cover %			
	'97	'02	'83	'89	'97	'02
Vegetation	333	333	5.50	10.00	29.22	34.22
Rock	115	166	1.25	2.25	1.96	2.78
Pavement	295	322	25.75	30.25	17.02	20.81
Litter	377	364	38.00	34.75	31.13	30.62
Cryptogams	221	229	3.00	8.50	7.60	13.11
Bare Ground	265	288	26.50	14.25	13.67	19.31

SOIL ANALYSIS DATA --
Herd Unit 18, Study no: 6, South of Soldier Creek

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
11.0	59.0 (12.0)	7.5	36.0	34.4	29.6	3.2	5.6	284.8	0.6



PELLET GROUP FREQUENCY --
Herd unit 18 , Study no: 6

Type	Quadrat Frequency		Pellet Transect	
	'97	'02	Pellet Groups per Acre ⁄02	Days Use per Acre (ha) ⁄02
Rabbit	29	29	-	-
Elk	1	4	61	5 (12)
Deer	19	8	52	4 (10)

BROWSE CHARACTERISTICS --
Herd unit 18 , Study no: 6

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
Y	83	9	-	-	-	-	-	-	-	-	5	4	-	-	300			9
	89	13	1	-	-	-	-	-	-	-	14	-	-	-	466			14
	97	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	83	28	3	-	-	-	-	-	-	-	-	31	-	-	1033	24	30	31
	89	8	8	-	-	-	-	-	-	-	14	1	1	-	533	30	31	16
	97	18	2	1	1	1	-	-	-	-	23	-	-	-	460	21	30	23
	02	16	6	5	-	1	-	-	-	-	27	1	-	-	560	19	30	28
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	4	6	-	-	-	-	-	-	-	8	-	1	1	333			10
	97	-	2	-	-	1	-	-	-	-	2	-	-	1	60			3
	02	1	6	5	1	-	2	-	-	-	7	-	-	8	300			15
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	160			8
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	08%	00%	00%	- 0%
'89	38%	00%	08%	-49%
'97	18%	03%	03%	+23%
'02	30%	27%	18%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	1333	Dec:	0%
	'89	1332		25%
	'97	680		9%
	'02	880		34%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	18	-	-	-	-	-	-	-	-	18	-	-	-	600			18
	89	31	-	-	-	-	-	-	-	-	31	-	-	-	1033			31
	97	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
	02	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	83	64	-	-	-	-	-	-	-	-	64	-	-	-	2133	11	18	64
	89	14	1	-	-	-	-	-	-	-	15	-	-	-	500	9	10	15
	97	108	-	-	10	-	-	-	-	-	115	-	-	3	2360	9	15	118
	02	87	-	-	4	-	-	2	-	-	93	-	-	-	1860	7	12	93
D	83	1	-	-	-	-	-	-	-	-	-	-	-	1	33			1
	89	12	-	-	-	-	-	-	-	-	12	-	-	-	400			12
	97	30	-	-	3	-	-	-	-	-	10	-	-	23	660			33
	02	28	6	-	-	-	1	1	-	-	23	-	-	13	720			36
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	01%	-30%
'89	02%	00%	00%	+40%
'97	00%	00%	16%	-17%
'02	05%	.75%	10%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	2766	Dec:	1%
	'89	1933		21%
	'97	3220		20%
	'02	2660		27%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	89	7	-	-	-	-	-	-	-	-	7	-	-	-	233			7
	97	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	13	-	-	-	-	-	-	-	-	13	-	-	-	433	8	12	13
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	8	13	1
	97	32	-	-	-	-	-	-	-	-	32	-	-	-	640	6	8	32
	02	31	-	-	-	-	-	-	-	-	31	-	-	-	620	4	7	31
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	240			12

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	-36%
'89	11%	00%	00%	+62%
'97	00%	00%	00%	+ 0%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	466	Dec:	0%
	'89	299		11%
	'97	780		0%
	'02	780		21%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	5	-	-	-	-	-	-	-	-	5	-	-	-	166	60	44	5
	89	5	-	-	-	-	-	-	-	-	5	-	-	-	166	73	55	5
	97	4	-	-	-	-	-	1	-	-	5	-	-	-	100	-	-	5
	02	8	-	-	-	-	-	-	1	-	9	-	-	-	180	-	-	9
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+17%
'89	00%	00%	00%	-50%
'97	00%	00%	00%	+44%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	166	Dec:	-
	'89	199		-
	'97	100		-
	'02	180		-

Opuntia spp.																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	2	-	-	-	-	-	-	-	-	1	-	1	-	66			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	6	-	-	-	-	-	-	-	-	6	-	-	-	120	6	16	6
	02	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	11	4
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	50%	+45%
'97	00%	00%	00%	-17%
'02	00%	00%	20%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	0%
	'89	66		0%
	'97	120		0%
	'02	100		20%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus monophylla																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+ 0%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'97	20		-
	'02	20		-